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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,978	01/23/2004	Plamen Denchev	205502-9037	9303

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EXAMINER

HWU, JUNE

ART UNIT PAPER NUMBER

1661

DATE MAILED: 09/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/764,978

Applicant(s)

DENCHEV ET AL.

Examiner

June Hwu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 43 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>same</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

The drawings have been approved.

Status of Claims

Claims 1-43 will be examined on the merits

Claim Objections

The claims are objected to because of the following informalities:

In claims 2-11, 13-15, 18-22, 24-35 and 38-42, line 1, a comma should be inserted before "wherein". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Dependent claims are included in all rejections.

Claims 1 and 23 are indefinite because they fail to recite any active, positive method steps delimiting how they are actually practiced. The claims are incomplete and unclear because it is uncertain as to what should be done in the "steps of induction, proliferation and prematuration". Method steps should also be written in gerund form, for example, "inducing an embryogenic culture by..."

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Claims 13 and 33 are broad in their recitation of "less auxin and less cytokinin", because it unclear how much of the growth regulators are utilized when in comparison to the prematuration and proliferation media.

Claim 18 is indefinite in its recitation of "more than about", since this is a relative term, it is unclear how much more percentage of nutrient medium is needed.

Claims 22, 28 and 40 recite the limitation "the nutrient medium" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 39 recites the limitation "the embryogenic culture" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14, 18-34 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over von Arnold (J. Plant. Physiol., 1987, vol. 128, pp. 233-244) in view of Schuller et al (IDS dated October 25, 2004, Plant Cell Reports, 1993, vol.12, no. 4, pp. 199-202) and further in view of Mantell et al (Principles of Plant Biotechnology an Introduction to Genetic Engineering in Plants, 1985, pp. 141-143), Dodds et al (Experiments in Plant Tissue Culture, 1985, 2nd ed. p. 41) and Find, U.S. Patent No. 6,897,065.

The claims are drawn to a method of reproducing conifers by somatic embryogenesis, wherein the galactose-containing compound is the main carbon source with the addition of

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auxin and cytokinin in the medium for the induction, proliferation and prematuration steps.

Moreover, abscisic acid is added at the prematuration step.

Von Arnold teaches that zygotic embryos of *Picea abies* were able to form embryogenic callus and eventually the callus produced plantlets (abstract). Von Arnold teaches that formation of embryogenic callus occurred when cultured in induction supplemented with galactose (monosaccharide), auxin and cytokinin (pages 234-235 and Table 5). The medium used for the proliferation of the callus was the same as the initiation except that the auxin was omitted (page 235). For the development of plantlets, the embryogenic callus was transferred to the cytokinin medium (page 241).

Von Arnold does not teach reproducing somatic embryogenesis with abscisic acid in the prematuration step.

Schuller et al teaches that lactose, a disaccharide, was a superior carbon source in the maturation stage of *Abies alba* (abstract and page 202). Further proliferation of somatic embryos occurred when abscisic acid was supplemented to the media (page 200).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of von Arnold by supplementing the prematuration step with abscisic acid to reproduce somatic embryogenesis in conifer as shown by Schuller in light of the fact that abscisic acid promotes maturation Find (col. 5, lines 36-38). Find also notes that galactose and lactose are other carbon sources that can be substituted (col. 4, lines 5-7). It would also be obvious to optimize result effective variables of auxin and cytokinin as shown by von Arnold in light of the fact that Mantell notes that it is well known in the art to experiment with varying degrees of growth regulators to optimize the performance of the growth and proliferation of the plant tissues (page 142). Moreover, the percentage of sugar in the nutrient medium as claimed by the Applicants was not disclosed in the prior art however, in light of the fact that

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Dodds teaches that the choice and concentration of the carbon source depends on the cultured plant tissue and the type of experiment (page 41). Therefore, optimization of parameters is a routine practice that would be obvious for a person of ordinary skill in the art to employ. Thus, absent some demonstration of unexpected results from the claimed parameters, this optimization of plant hormones and amount of sugar in the nutrient medium would have been obvious at the time of Applicants' invention.

Hence, it would have been obvious to one of ordinary skill in the art to modify the method of von Arnold by optimizing the growth regulators as shown by Mantell, the amount of sugar in the nutrient medium as shown by Dodds and supplementing the medium with abscisic acid as shown by Schuller to reproduce conifers by somatic embryogenesis. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Claims 1-9, 12-13, 18-29, 32, 33, and 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over von Arnold (J. Plant. Physiol., 1987, vol. 128, pp. 233-244) in view of Vuke et al (Plant Cell Reports, 1987, 6(2), pp. 153-156) and further in view of Mantell et al (Principles of Plant Biotechnology an Introduction to Genetic Engineering in Plants, 1985, pp. 141-143), Dodds et al (Experiments in Plant Tissue Culture, 1985, 2nd ed. p. 41).

The claims are drawn to a method of reproducing conifers by somatic embryogenesis, wherein the galactose-containing compound is the main carbon source with the addition of auxin and cytokinin in the medium for the induction, proliferation and prematuration steps.

Von Arnold teaches that zygotic embryos of *Picea abies* were able to form embryogenic callus and eventually the callus produced plantlets (abstract). Von Arnold teaches that formation of embryogenic callus occurred when cultured in induction supplemented with

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galactose (monosaccharide), auxin and cytokinin (pages 234-235 and Table 5). The medium used for the proliferation of the callus was the same as the initiation except that the auxin was omitted (page 235). For the development of plantlets, the embryogenic callus was transferred to the cytokinin medium (page 241).

Von Arnold does not teach the reproduction of somatic embryogenesis with the *Pinus* species.

Vuke et al teaches callus of *Pinus taeda* was able to grow in media supplemented with galactose or lactose (Table 1). The basal medium for the pine callus initiation and stock culture maintenance contained naphthyleneacetic (NAA) and benzyl amino purine (BAP) (page 153).

It would have been obvious to one of ordinary skill in the art to reproduce somatic embryogenesis of *Pinus* species as shown by Vuke by the method steps of reproducing somatic embryogenesis in conifers as taught by von Arnold. It would also be obvious to optimize result effective variables of auxin and cytokinin as shown by von Arnold in light of Mantell (page 142) as stated above. Moreover, the amount of sugar in the nutrient media would vary depending on the source of the plant material and the type of experiment as noted by Dodds (page 41) above. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Claims 1-12, 14, 18-21, 23-32, 34, 38, 39, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over von Arnold (J. Plant. Physiol., 1987, vol. 128, pp. 233-244) in view of Uddin (U.S. Patent No. 5,187,092) and further in view of Mantell et al (Principles of Plant Biotechnology an Introduction to Genetic Engineering in Plants, 1985, pp. 141-143), Dodds et al (Experiments in Plant Tissue Culture, 1985, 2nd ed. p. 41).

The claims are drawn to a method of reproducing *Pinus taeda*, *Pseudotsuga menziesii* and *Pinus radiata* by somatic embryogenesis, wherein the galactose-containing compound is the main carbon source with the addition of auxin and cytokinin in the medium for the induction, proliferation and prematuration steps. Moreover abscisic acid is added to the prematuration step.

Von Arnold teaches that zygotic embryos of *Picea abies* were able to form embryogenic callus and eventually the callus produced plantlets (abstract). Von Arnold teaches that formation of embryogenic callus occurred when cultured in induction supplemented with galactose (monosaccharide), auxin and cytokinin (pages 234-235 and Table 5). The medium used for the proliferation of the callus was the same as the initiation except that the auxin was omitted (page 235). For the development of plantlets, the embryogenic callus was transferred to the cytokinin medium (page 241).

Von Arnold does not specifically teach the method of reproducing somatic embryogenesis in the genera *Pinus* and *Pseudotsuga*.

Uddin teaches a method of reproducing somatic embryogenesis in *Pinus taeda*, *Pseudotsuga menziesii* and *Pinus radiata* with glucose a monosaccharide or maltose a disaccharide in amount of 3-6% as the carbon source in the plant tissue culture media supplemented with abscisic acid (columns 3-4 and Table 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to reproduce somatic embryogenesis in *Pinus* and *Pseudotsuga* species as taught by Uddin by using the culture medium taught by von Arnold. One would have been motivated to do so given the recognized method by von Arnold. The optimization of the auxin and cytokinin in the nutrient medium would have been a routine practice to a person of ordinary skill as stated by Mantell (page 141) above. Moreover, the amount of sugar in the nutrient media would vary

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depending on the source of the plant material and the type of experiment as noted by Dodds (page 41) above. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Conclusion

Claims 15-17 and 35-37 are free of prior art because the prior art does not teach or suggest the method of reproducing conifers in which one of induction, proliferation and prematuration steps media containing galactose-containing sugar are supplemented with additional sugars such as sucrose, glucose and fructose.

Future Correspondence

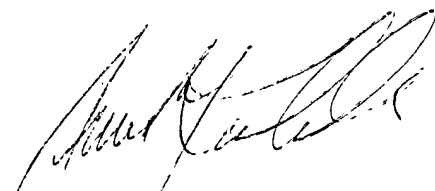
Any inquiry concerning this communication or earlier communications from the examiner should be directed to June Hwu whose telephone number is (571) 272-0977. The Examiner can normally be reached Monday through Thursday from 6:30 a.m. to 5:00 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Andrew Wang, can be reached on (571) 272-0811. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June Hwu

September 21, 2005



ANNE KUBELIK, PH.D.
PRIMARY EXAMINER